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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,831	04/16/2004	Sudhir Gondhalekar	007728	9468.
7590 09/14/2005			USAP01/DSM/HDP/CVD	
APPLIED MATERIALS, INC. Patent Department, M/S 2061 P.O. Box 450A Santa Clara, CA 95052			EXAMINER ZERVIGON, RUDY	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 09/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

1.02

Office Action Summary	Application No. 10/825,831	Applicant(s) GONDHALEKAR ET AL.	
	Examiner Rudy Zervigon	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>All</u> . | 6) <input type="checkbox"/> Other: _____ |

5.0.0

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over McMillin; Brian et al. (US 6,013,155 A) in view of Rohrberg; Roderick (US 3,604,889 A). McMillin teaches a replaceable gas nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) that is insertable in a gas distributor ring (170; Figure 2a,b; column 6; line 66 - column 7, line 18) of a substrate processing chamber (140; Figure 1; column 6; lines 44-65) and that can be shielded within the chamber (140; Figure 1; column 6; lines 44-65), the gas nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) comprising: a longitudinal ceramic body (180; Figures 12a,b; 13a,b) having a channel (conduit not labelled; Figures 12a,b; 13a,b) to direct the flow of the gas into the chamber (140; Figure 1; column 6; lines 44-65), the channel (conduit not labelled; Figures 12a,b; 13a,b) comprising an inlet to receive the gas from the gas distributor ring (170; Figure 2a,b; column 6; line 66 - column 7, line 18), and a pinhole outlet at the end of the channel (conduit not labelled; Figures 12a,b; 13a,b) to release the gas into the chamber (140; Figure 1; column 6; lines 44-65) – claim 1

McMillin further teaches:

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- i. A nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) according to claim 1 wherein the ceramic body (180; Figure 1) is composed of aluminum oxide (column 6; line 66 - column 7, line 18), as claimed by claim 5

ii.

McMillin does not teach a second external thread to receive a heat shield. McMillin does not teach ceramic body (180; Figure 1) comprising a first external thread to mate with the gas distributor ring (170; Figure 2a,b; column 6; line 66 - column 7, line 18).

McMillin further does not teach:

- i. McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) according to claim 1 wherein the pinhole outlet has a diameter d_o , and wherein the distance dst between the second external thread and the pinhole outlet is about $90 d_o$ to about $140 d_o$, as claimed by claim 2
- ii. McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) according to claim 2 wherein d_o is from about 0.3 mm to about 0.4 mm, as claimed by claim 3
- iii. McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) according to claim 2 wherein dst is from about 30 mm to about 55 mm, as claimed by claim 4
- iv. McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) according to claim 1 wherein the ceramic body (180; Figure 1) is composed of aluminum nitride, as claimed by claim 6

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- v. McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) according to claim 1 wherein the ceramic body (180; Figure 1) tapers at an angle from about 35 to about 45° to the pinhole outlet, as claimed by claim 7
- vi. McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) according to claim 1 further comprising a heat shield mounted on the second external thread, as claimed by claim 8
- vii. a heat shield for shielding a nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) extending into a chamber (140; Figure 1; column 6; lines 44-65) to introduce a process gas into the chamber (140; Figure 1; column 6; lines 44-65) through a nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) outlet, wherein the chamber (140; Figure 1; column 6; lines 44-65) defines a processing region therein and has a substrate support (130; Figure 2a) to support (130; Figure 2a) a substrate for processing in the chamber (140; Figure 1; column 6; lines 44-65), the heat shield comprising: a hollow member configured to be coupled with McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) and having an internal dimension sufficiently large to be disposed around at least a portion of McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18), the hollow member having an extension which projects distally of McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) outlet and which includes a heat shield opening for the process gas to flow therethrough from McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) outlet, as claimed by claim 9
- viii. The heat shield of claim 3 wherein the hollow member is cylindrical and has an internal cross-section which is larger than an external cross-section of McMillin's nozzle (180;

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- Figure 1; column 6; line 66 - column 7, line 18) by about an amount smaller than the thickness of the heat shield, as claimed by claim 10
- ix. The heat shield of claim 3 wherein the hollow member comprises a ceramic material, as claimed by claim 11
 - x. The heat shield of claim 3 wherein the extension of the heat shield is sized to project distally of McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) outlet by a distance of between about a radius of McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) and about a diameter of McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18), as claimed by claim 12
 - xi. a heat shield according to claim 5 wherein the ceramic material comprises aluminum oxide (column 6; line 66 - column 7, line 18) or aluminum nitride, as claimed by claim 13
 - xii. a heat shield according to claim 6 wherein the extension projects distally by about 5 mm to about 8 mm, as claimed by claim 14
 - xiii. the shielded gas nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) for a substrate processing chamber (140; Figure 1; column 6; lines 44-65) comprising: (a) a longitudinal ceramic body (180; Figures 12a,b; 13a,b) having a channel (conduit not labelled; Figures 12a,b; 13a,b) to direct the flow of the gas into the chamber (140; Figure 1; column 6; lines 44-65), the ceramic body (180; Figure 1) comprising a first external thread to mate with the gas distributor ring (170; Figure 2a,b; column 6; line 66 - column 7, line 18), a second external thread to receive a heat shield, the channel (conduit not labelled; Figures 12a,b; 13a,b) comprising an inlet to receive the gas from the gas distributor ring (170; Figure 2a,b; column 6; line 66 - column 7, line 18), and a pinhole

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outlet at the end of the channel (conduit not labelled; Figures 12a,b; 13a,b) to release the gas into the chamber (140; Figure 1; column 6; lines 44-65). (b) a hollow member configured to be coupled with the ceramic body (180; Figure 1) and having an internal dimension sufficiently large to be disposed around at least a portion of the ceramic body (180; Figure 1), the hollow member having an extension which projects distally of the pinhole outlet and which includes a heat shield opening for the process gas to flow therethrough from the pinhole outlet, as claimed by claim 15

- xiv. McMillin's nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) according to claim 1 wherein the pinhole outlet has a diameter d_o , and wherein the distance d_{st} between the second external thread and the pinhole outlet is about $90 d_o$ to about $140 d_o$, as claimed by claim 16
- xv. The heat shield of claim 3 wherein the hollow member is cylindrical and has an internal cross-section which is larger than an external cross-section of the ceramic body (180; Figure 1) by about an amount smaller than the thickness of the hollow member, as claimed by claim 17
- xvi. The heat shield of claim 3 wherein the extension of the hollow member is sized to project distally of the pinhole outlet by a distance of between about a radius of the ceramic body (180; Figure 1) and about a diameter of the ceramic body (180; Figure 1), as claimed by claim 18
- xvii. the shielded gas nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) according to claim 1 wherein the ceramic body (180; Figure 1) and hollow member are composed of aluminum oxide (column 6; line 66 - column 7, line 18), as claimed by claim 19

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- xviii. the shielded gas nozzle (180; Figure 1; column 6; line 66 - column 7, line 18) according to claim 1 wherein the ceramic body (180; Figure 1) and the hollow member are composed of aluminum nitride, as claimed by claim 20

Rohrberg teaches a double threaded gas nozzle (40; Figure 1) including a shield (22,20,24; Figure 1) for said nozzle.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace McMillin's gas nozzle with Rohrberg's double threaded gas nozzle and shield, inclusive, for Rohrberg to optimize the dimensions and materials of his apparatus with .

Motivation to replace McMillin's gas nozzle with Rohrberg's double threaded gas nozzle and shield, inclusive, for Rohrberg to optimize the dimensions and materials of his apparatus is for uniformly distributing process gas over a process area as taught by Rohrberg (column 3, lines 51-66). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04). Further, it is well settled that the intended uses of and the particular material used in a coating apparatus have no significance in determining patentability of apparatus claims. (Ex parte Thibault, 164 U.S.P.Q. 666 (Bd. Pat. App. 1969), MPEP 2116).

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

US 20040226512 A1

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US 20040224090 A1

US 20040185610 A1

US 20040182517 A1

US 20040152341 A1

US 20040129210 A1

US 20040126952 A1

US 20030213562 A1

US 20030211757 A1

US 20030085205 A1

US 20030070619 A1

US 20030050724 A1

US 20030024901 A1

US 20020185225 A1

US 20020150682 A1

US 20020127350 A1

US 20020086106 A1

US 20020000198 A1

US 6929700 B2

US 6926926 B2

US 6914016 B2

US 6890597 B2

US 6869499 B2

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US 6808567 B2

US 6803325 B2

US 6704913 B2

US 6682603 B2

US 6660662 B2

US 6632726 B2

US 6486081 B1

US 6446572 B1

US 6432256 B1

US 6403491 B1

US 6375750 B1

US 6286451 B1

US 6250250 B1

US 6189483 B1

US 6182602 B1

US 6178918 B1

US 6143078 A

US 6111225 A

US 6109206 A

US 6106737 A

US 6083344 A

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US 6077357 A

US 5994662 A

US 5954881 A

US 5900103 A

US 5885358 A

US 5792272 A

US 5722455 A

US 5686151 A

US 5620523 A

US 5614055 A

US 5592581 A

US 5567267 A

US 5540772 A

US 5522936 A

US 5522934 A

US 5376166 A

US 5248071 A

US 5188671 A

US 4928626 A

US 4330086 A

US 3865173 A

US 3649805 A

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US 6446572 B

US 4342426 A

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

A handwritten signature in black ink, appearing to read 'Rudy Zervigon', with the initials 'RZ' written below it.